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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,955	10/29/2004	Kazunori Kobayashi	261119US90PCT	5313
22850	7590	04/07/2009		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER ARMSTRONG, ANGELA A	
			ART UNIT 2626	PAPER NUMBER
			NOTIFICATION DATE 04/07/2009	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/510,955

Applicant(s)

KOBAYASHI ET AL.

Examiner

ANGELA A. ARMSTRONG

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3- 8, and 10-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1, 3-8, and 10 is/are allowed.
- 6) ☒ Claim(s) 11-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SI/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the amendment filed January 8, 2009, amending claims 1, 3-8, 10-11, 13, 17, 21 and cancelling claims 2 and 9. Currently, claims 1, 3-8, and 10-20 are pending.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 5, 7, 8, 10-14, and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balan (US Patent No. 7,218,741) in view of Mapes-Riordan et al, "Echo Control in Teleconferencing Using Adaptive Filters", 95th Convention, October 7, 1993, pages 1-11.
3. Balan discloses a system and method for adaptive multi-sensor arrays.
4. Regarding claims 11 and 16-17, Balan teaches a sound acquisition method (and provides support for an apparatus at element 401) for acquiring sound from at least one sound source by microphone (col. 4, line 66) and teaches (a) deciding an utterance period from signals received (col. 3, lines 60-63 – the voice activity detector); a frequency domain converting step of converting said received signals to frequency domain signals (col. 5, lines 13-14); a covariance matrix calculating step of calculating a covariance matrix of said frequency domain received signals (col. 5, lines 3-31); a covariance matrix storage step of storing said covariance matrix for

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each sound (col. 5, lines 3-31-- covariance matrix is updated). Balan does not teach, but Mapes-Riordan does teach receiving signals from a loudspeaker, calculating filter coefficients, filtering the received signals, cancelling an echo sound; and adding together the results of filtering in said plural channels, and providing the added output as a send signal ("adaptive filtering in teleconferencing systems"). It would have been obvious to modify the system Balan to implement the filter coefficient and echo cancellation processing suggested by Mapes-Riordan, for the purpose of enhancing the received signal by maximizing the signal to noise ratio.

5. Regarding claims 12 and 19, the combination of Balan and Mapes-Riordan teach said state decision step includes a step of deciding a noise period from said acquired signal and said received signal; said covariance matrix calculating step includes a step of calculating a covariance matrix in said noise period; said covariance matrix storing step includes a step of storing said covariance matrix in said noise period; and said filter coefficient calculating step calculates received signal filter coefficients of said at least one channel and said acquired signal filter coefficients based on said stored covariance matrices in said utterance period, said receiving period and said noise period so that said acoustic echo and noise are cancelled (page 15, lines 1-3 and page 24, line 21 to page 26, line 8 – the system determines the noise covariance matrix and implements echo cancellation in the adaptive filter beamformer process).

6. Regarding claims 13 and 18, the combination of Balan and Mapes-Riordan teach a microphone for plural channels (col. 4, line 66) and sound source detecting for detecting the sound source position (col. 3, lines 60-63).

7. Regarding claims 14 and 20, the combination of Balan and Mapes-Riordan disclose assigning weights to the sound sources (page 6, lines 1-20).

8. Regarding claim 21, Balan discloses the system can be implemented in software (col. 4, lines 21-28).
9. Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balan in view of Mapes-Riordan and further in view of Sim (US Patent No. 6,771,219).
10. Regarding claims 6 and 15, Balan does not teach multiplying the covariance matrix by a weight based on the diagonal component and a matrix. Sim discloses an adaptive beamforming method which vector weights are updated based on a diagonal matrix component (col. 3, line 27 to col. 4, line 4). Sim teaches the system provides adaptive beamforming methods capable of reducing computational load. It would have been obvious to one of ordinary skill at the time of the invention to modify the system of Balan, as modified by Mapes-Riordan, and to implement the matrix weighting as taught by Sim, because such a modification would generate the beamforming adaptive weighting with a reduction in processing and computational loads.

Allowable Subject Matter

11. Claims 1, 3-8, and 10 are allowed.

Response to Arguments

12. Applicant's arguments with respect to claims 11-21 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANGELA A. ARMSTRONG whose telephone number is (571)272-7598. The examiner can normally be reached on Monday-Thursday 11:30-8:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick N. Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Angela A Armstrong/
Primary Examiner, Art Unit 2626